

WE CLAIM:

1 1. An enclosure for an optical communications device that joins with a connector
2 of an optical cable, the enclosure comprising:

3 a base portion;

4 a lid portion having focusing elements and affixed to the base portion, wherein the lid
5 portion and the base portion are adapted to receive at least a portion of the optical

6 communications device therebetween; and

7 at least one alignment member formed on the lid portion, the alignment member
8 adapted to interface with the connector to align the connector relative to lid portion.

1 2. The enclosure of claim 1 wherein the lid portion is recessed to receive at least
2 a portion of the optical communications device therebetween.

1 3. The enclosure of claim 1 wherein the at least one alignment member is metal
2 deposited into the shape of the at least one alignment member.

1 4. The enclosure of claim 3 further comprising a preliminary layer on the lid
2 portion to promote adhesion of the deposited metal.

1 5. The enclosure of claim 1 wherein the at least one alignment member is a
2 prefabricated alignment member bonded to the lid portion.

1 6. The enclosure of claim 5 further comprising a preliminary metal layer on the
2 lid portion, and wherein the prefabricated alignment member comprises metal welded to the
3 preliminary metal layer.

1 7. The enclosure of claim 1 wherein the at least one alignment member is shaped
2 from the lid portion.

1 8. The enclosure of claim 1 wherein the at least one alignment member is a
2 microsphere.

1 9. The enclosure of claim 1 wherein the lid portion further comprises at least one
2 recess which receives the at least one alignment member.

1 10. The enclosure of claim 1 wherein at least a portion of the lid portion is
2 transparent and the focusing element is formed into the lid portion.

1 11. The enclosure of claim 1 wherein the at least one alignment member has a
2 flared base portion.

1 12. The enclosure of claim 1 wherein the at least one alignment member is formed
2 on an overlay, and the overlay is affixed to the lid portion.

1 13. A method of fabricating an optical interconnect device, the optical
2 interconnect device including optical-electrical components for interfacing an optical and an
3 electrical signal, comprising:

4 forming at least two alignment members on a substrate;

5 affixing the substrate to a base material with at least a portion of the optical-electrical
6 components therebetween; and

11/15/2017 10:46:00 AM

7 segmenting the affixed substrate and base material into at least two portions of affixed
8 substrate and base material, each portion having at least one alignment member.

1 14. The method of claim 13 wherein forming at least two alignment members
2 comprises depositing material in the shape of at least two alignment members.

1 15. The method of claim 14 further comprising using a mold to shape the
2 deposited material.

1 16. The method of claim 14 wherein the material is a metal deposited in a
2 chemical vapor deposition process.

1 17. The method of claim 14 wherein the material is a curable material that bonds
2 with the substrate as it hardens.

1 18. The method of claim 14 further comprising the step of depositing a
2 preliminary layer on the substrate to promote adhesion of the at least two alignment
3 members.

1 19. The method of claim 13 wherein forming at least two alignment members
2 comprises molding the at least two alignment members together with the substrate.

1 20. The method of claim 13 wherein forming the at least two alignment members
2 comprises machining the substrate to form the at least two alignment members.

1 21. The method of claim 13 where forming the at least two alignment members
2 comprises etching the substrate using photolithography techniques to form the at least two
3 alignment members.

1 22. The method of claim 14 wherein forming the at least two alignment members
2 on the substrate comprises affixing at least two prefabricated alignment members to the
3 substrate.

1 23. The method of claim 14 wherein forming the at least two alignment members
2 on the substrate comprises affixing an overlay having at least two alignment members
3 thereon to the substrate.

1 24. The method of claim 14 further comprising etching the substrate using
2 photolithography techniques to form at least one recess; and
3 wherein the step of depositing material in the shape of at least two alignment
4 members further comprises depositing material into the at least one recess in the shape of at
5 least one of the at least two alignment members.

1 25. A structure divisible into two or more optical communication devices, each
2 optical communications device having at least one optical electrical device, and each optical
3 communications device adapted to join with a connector of an optical cable, the structure
4 comprising:
5 a first substrate having at least two optical electrical devices thereon;
6 a second substrate affixed to the first substrate with the at least two optical
7 electrical devices positioned therebetween; and

8 at least two alignment members formed on the second substrate and each
9 alignment member adapted to interface with the connector to align the connector in relation
10 to the second substrate.

1 26. The structure of claim 25 wherein at least one of the at least two alignment
2 members is a prefabricated alignment member bonded to the second substrate.

1 27. The structure of claim 25 wherein at least one of the at least two alignment
2 members is shaped from the second substrate.

1 28. The structure of claim 26 wherein at least one of the at least two alignment
2 members is a microsphere.

1 29. The structure of claim 25 further comprising at least two optical components
2 on the second substrate.

1 30. The structure of claim 26 wherein at least one of the at least two alignment
2 members is formed on an overlay and affixed to the second substrate.

1 31. The structure of claim 25 wherein at least a portion of the second substrate is
2 transparent and the second substrate further comprises at least two optical devices formed in
3 the second substrate.

1 32. An electro-optical interconnect device for coupling to a parallel fiber-optic
2 cable:
3 an electro-optical transducer;

4 a base including an integrated circuit electrically connected to said electro-optical
5 transducer; and

6 a lid including an array of optical elements optically coupled to said electro-optical
7 transducer, said lid assembly including at least one pin for engaging said cable, said lid
8 assembly and said base assembly collectively enclosing said electro-optical transducer.

1 33. A device as recited in claim 32 wherein said electro-optical transducer is
2 disposed between said integrated circuit and said array of optical elements.